Engineering Report

Mountain Edge Parkway & Interchange

Las Vegas, Clark County, Nevada

Submitted to:

City of Las Vegas

April 2007

MSH-21013
04/26/07 PC

Comparative Analysis
For the North Alignment and Existing Alignment of the Mountain Edge Parkway
Master Plan of Streets and Highway Amendment

1. Purpose

The purpose of this report is to analyze and compare the two alternative alignments for the Mountain Edge Parkway in the northwest City of Las Vegas, crossing U.S. 95. As discussed in this report, there are a number of land use, environmental, socioeconomic, noise, capital cost, and engineering reasons that make the North Alignment, described in this report as the Preferred Alignment, the more effective and efficient alignment for the Mountain Edge Parkway. The locations of the Preferred Alignment and Existing Alignment are shown in Figure 1.

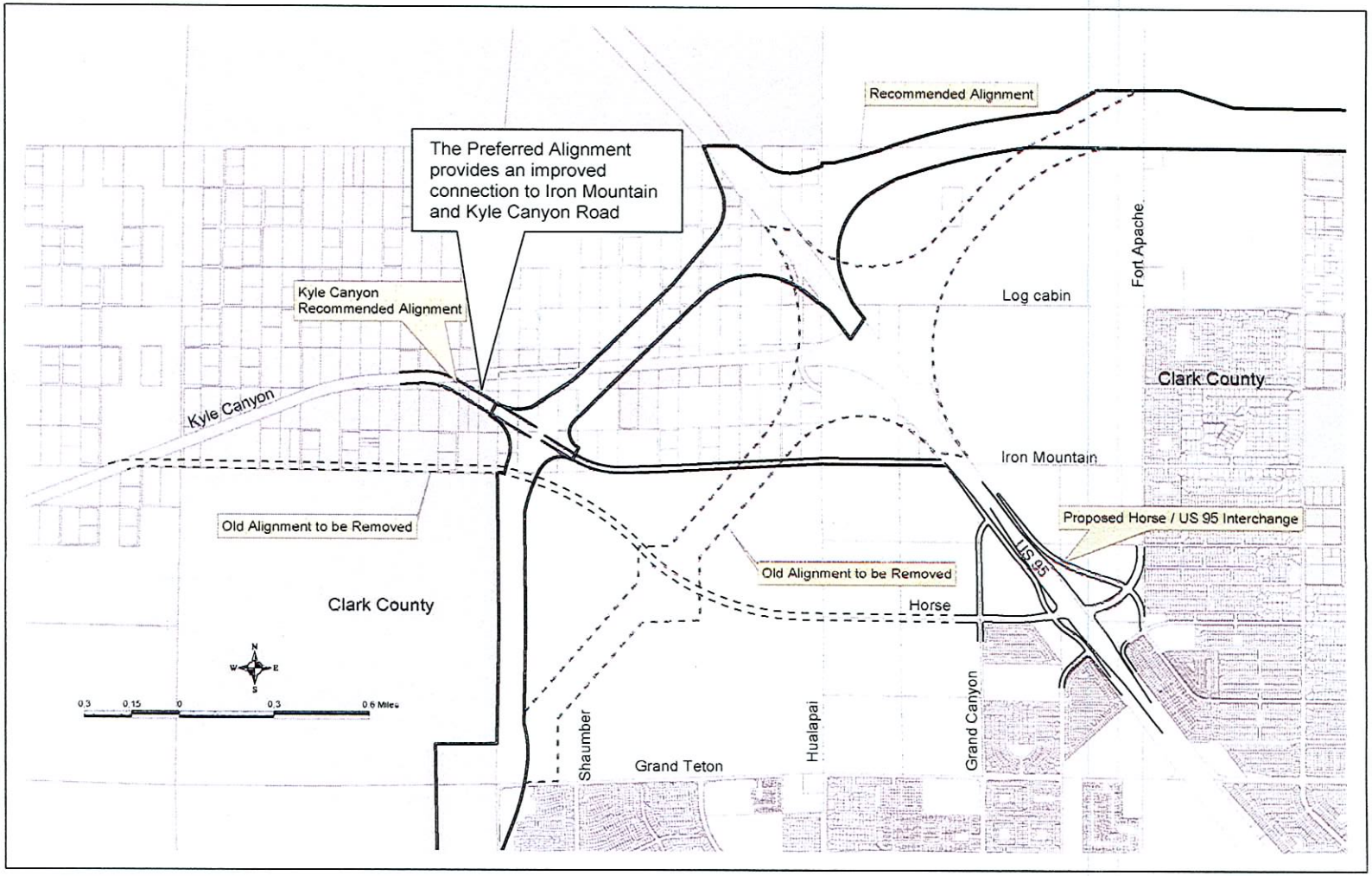
2. Background

Rapid population growth has occurred and is expected to continue in the northwest Las Vegas Valley. According to the *City of Las Vegas Master Plan 2020*, the City's population is expected to increase from approximately 478,000 in 2000 to as much as 800,000 by the year 2020. Based on current trends, over 96 percent of this projected growth is expected to occur in the west and northwest areas of the City, including the vicinity of the Mountain Edge Parkway corridor.

The connection between Clark County 215 and U.S. 95 to be provided by the Mountain Edge Parkway would serve immediate and long-term travel demand in the northern Las Vegas Valley. The Kyle Canyon Gateway Master Planned Community (KCG) is to be located in the immediate vicinity of U.S. 95 north of Grand Teton Road. This proposed community would include mixed use development and high average residential housing densities of approximately 11 units per acre. The resultant traffic from this development would greatly add to the existing congestion along U.S 95 in the area. The KCG is representative of the region's trend in higher housing unit density and integrated residential and commercial development.

In 2003, the City of Las Vegas, City of North Las Vegas, Clark County, Nevada Department of Transportation (NDOT), and the Regional Transportation Commission of Southern Nevada (RTC) participated in a charrette to address the anticipated transportation needs of the northern Las Vegas Valley. The entities reached consensus that reservation of a multi-modal transportation corridor, such as the Mountain Edge Parkway, would be needed to accommodate anticipated growth. The group also identified a need to expand the region's roadway network to serve development that would occur within the BLM disposal boundary. This planning framework was adopted by the City of Las Vegas and was incorporated into the Master Plan for Streets and Highway on February 18th 2004 and Clark County Transportation Element of the Comprehensive Plan on July 16th 2003. The RTC also adopted the Mountain Edge Parkway into the Regional Transportation Plan to address long term regional travel demand needs.

Figure 2 – Regional Roadway Connectivity



3. Engineering and Environmental Factors

An analysis was completed to compare the two design alternatives based on the following design factors: geometry, construction cost, land use, socioeconomics, and environmental issues (air quality, flood control, and noise/visual resources).

Geometrics

Both alignments have similar characteristics. They have the same number of lanes and provide the same vehicle capacity. From an engineering perspective, the Preferred Alignment offers several advantages over the Existing Alignment, as described below:

- The City of Las Vegas is currently designing a new interchange at U.S. 95 and Horse Drive. Under the Existing Alignment, the interchange spacing between Horse Drive and the Mountain Edge Parkway would be approximately one-half mile, which is less than the one mile AASHTO/FHWA standard for interchange spacing. Braided ramps between Horse Drive and the Mountain Edge Parkway would be required to separate the on and off ramp movements via additional bridge structures and elevated roadways. Additional right-of-way would be required to accommodate braided ramps between these two locations. By moving the Mountain Edge Parkway/U.S. 95 system-to-system interchange to the north, the use of braided ramps is avoided.

- The Preferred Alignment is perpendicular to U.S. 95. This perpendicular connection will result in slightly smaller interchange foot print thereby reducing the right-of-way requirements for the system-to-system interchange.

- The Preferred Alignment reduces the length of bridge spans for the system-to-system connectors, which reduces the construction cost of the bridges.

- The Preferred Alignment provides improved transportation patterns through a direct connection from Kyle Canyon Road to the Mountain Edge Parkway and Iron Mountain Road (see Figure 2).

Figure 3 - Planned Land Use

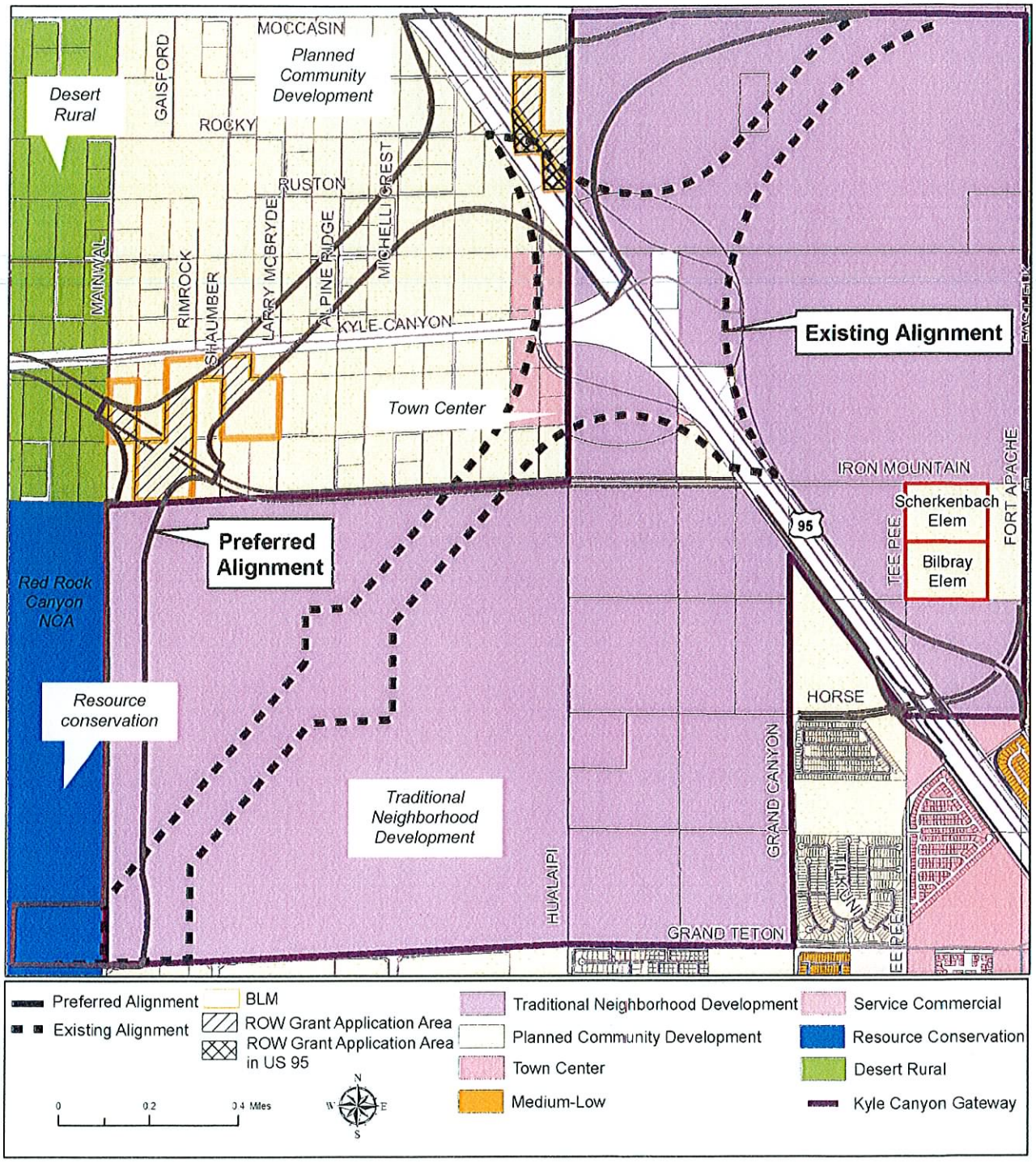


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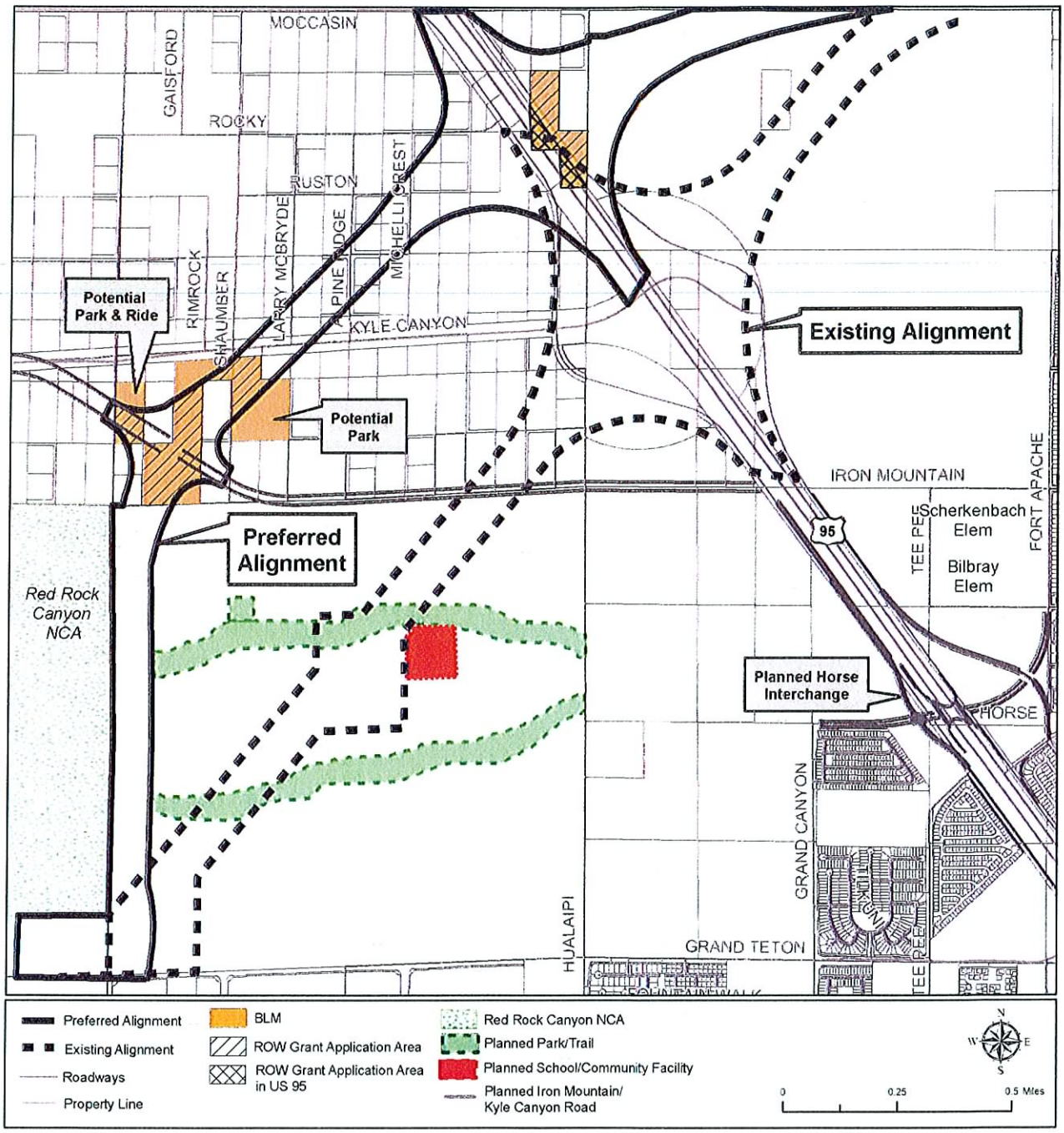
Figure 4 - Community Facilities



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Conceptual Construction Cost Estimate

The conceptual cost estimates for the Mountain Edge Parkway compare the cost of developing the system–to-system interchange on the Preferred Alignment to construction costs for the Existing Alignment. Overall, the total cost for the U.S. 95 /Mountain Edge Parkway Interchange for the Preferred Alignment is $317 million. The system-to-system interchange within the Existing Alignment is estimated at $426 million, in 2020 dollars. This assumes an escalation rate of 4% per year. The reason for this cost difference is that the Preferred Alignment interchange footprint is smaller than the Existing Alignment and does not require the use of braided ramps, additional bridges, or bridge widening. The Existing Alignment's Bureau of Land Management right-of-way grant does not include enough land to accommodate braided ramps between the Horse Drive and Mountain Edge Parkway interchange with U.S. 95. Therefore, the purchase of right-of-way would be needed along this segment for the Existing Alignment interchange to accommodate braided ramps. This right of way would be purchased at fair market value.

Land Use

The Preferred Alignment brings a number of land use benefits. Specifically, it offers an opportunity to ensure an optimal land use plan for the KCG area. Under the Existing Alignment, the planned residential and mixed-use development at KCG would be bisected by a transportation corridor that is 550 feet wide (see Figure 3). The Preferred Alignment circumvents the edges of the KCG and allows for the development of more mixed uses, higher densities, pedestrian connections, trails, and amenities that can serve the internal transportation needs of the community.

Because the Mountain Edge Parkway includes provisions for the development of transit and pedestrian trails, and park-and-ride facility, the new alignment means that more efficient connections can be created between the KCG and future regional transit service. A higher level of transit connectivity will prove extremely valuable over the long term as the Las Vegas Valley continues to develop regional transit connections supporting regional travel demands.

The Preferred Alignment allows for two miles of trails along existing arroyos in KCG. This translates to over 24 acres of land being set aside for trails and preservation of natural areas that would be bisected by the Existing Alignment. As shown in Figure 4, the Preferred Alignment ensures that the planned parks and linear trail system in KCG can be developed without noise, visual, and access impacts from a highway facility. The linear park would be bisected by the Existing Alignment, which would reduce their attractiveness for recreation users. A school/community center is also planned in close proximity to the Existing Alignment. The Preferred Alignment is adjacent to the Red Rock National Conservation Area provides a buffer and improved trail access.

The Preferred Alignment would be compatible with City of Las Vegas land use and transportation planning objectives to develop the area as a cohesive neighborhood. It would minimize adverse impacts to planned residential areas and would support future commercial development. It would also support City of Las Vegas plans for other public

uses adjacent to the Preferred Alignment, including a park and ride, recreational park, and trail system. It would provide a utility corridor and would provide for flood control, multi-use trails, transit, and would also incorporate an existing 100 foot power easement into the Mountain Edge Parkway Corridor. This would minimize impacts to land needed for infrastructure and provide regional flood control protection to an additional 320 acres of land.

Use of the Existing Alignment would result in a facility that is not compatible with current land use plans and would have adverse impacts on planned residential neighborhoods due to its close proximity to housing units.

Socioeconomic Factors

The northwest Las Vegas Valley is experiencing strong population growth that is expected to continue through the year 2030. The traffic analysis zones (TAZs) that fall within the study area are bounded by the City of Las Vegas boundary to the west, Moccasin Road to the north, Durango Road to the east, and Grand Teton Drive to the south. Within this area, the 2000 population reported by the U.S. Census was 1,559. The 2006 RTC population estimates increased to almost 16,000 and continued growth to over 48,000 residents is projected by 2030. Employment is expected to increase from 965 in 2006 to 6,339 in 2030. A summary population trends reflected by RTC and U.S. Census data is shown in Table 1. This formerly undeveloped area is undergoing a rapid transformation into an urbanized community. Similarly, the population of the urbanized Las Vegas Valley is expected to increase almost 80 percent from 1.8 million to 3.2 million between 2006 and 2030. Employment is projected to increase from 864,213 to over 1.5 million during the same period. It should be noted that population forecasts for the Las Vegas Valley have historically substantially underestimated population growth. Ultimate build-out potential for this area of the northwest Las Vegas Valley and for the metro region as a whole is substantially higher, as documented in the *Mountain Edge Parkway Feasibility Study*.

The Preferred Alignment will allow for a more orderly development of residential, commercial, and other employment based land uses that will generate income, jobs, and tax revenues from property and retail sales activity. The Existing Alignment would not allow for optimal land development and would therefore reduce the socioeconomic benefits that the KCG master planned community will generate for the City.

Table 1: Study Area Population and Employment Growth

	2000*	2006**	2030**
Population	1,559	15,924	48,056
Employment	-	965	6,339

*Source: U.S. Census, 2000

** Source: RTC Population Forecasts, 2006.

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4 Conclusion

The relocation of the Mountain Edge Parkway corridor from the Existing Alignment to the Preferred Alignment is recommended based upon the engineering, capital cost, land use, socioeconomics, and environmental factors. The new alignment offers the opportunity to develop a system-to-system interchange that is less costly, provides for substantially fewer land use conflicts, and will promote more efficient land use patterns that are environmentally and economically sustainable. A summary of the comparison of alignments is provided in Table 2.

Table 2: Issues Summary

Issue	Preferred Alignment	Existing alignment
Geometrics	• 1 mile spacing to Horse Interchange (meeting AASHTO/FHWA standard) • Perpendicular approach to US 95 • Smaller interchange footprint and shorter bridge spans • Improved connection for Iron Mountain Road and Kyle Canyon Road	• ½ mile spacing to Horse Interchange (not meeting ASSHTO/FHWA standard) • Skewed approach to US 95 • Larger interchange footprint and longer bridge spans
Capital Costs	• $317 million for US 95 interchange	• $426 million for US 95 interchange • Longer bridge spans • Additional ROW needed to accommodate braided ramps and bridge spans
Land Use	• Promotes residential and mixed use development in Kyle Canyon Gateway (KCG) • Promotes trails and parks / community facilities in KCG • Provides are for a park-and-ride for transit • Provides integrated utility corridor • Compatible with City land use plans	• Bisects residential and mixed uses planned for KCG • Bisects trails and impacts parks / community facilities in KCG • No park-and-ride for transit • Incompatible with City land use plans
Socioeconomic	• Supports residential population and employment growth	• Precludes optimal development of KCG
Air Quality	• Conforms to SIP • Air quality benefits realized sooner due to lower cost and less complex design	• Conforms to SIP • Air quality benefits delayed due to higher cost and more complex design • Capital cost may delay other transportation improvements
Flood Control	• Provides flood protection for an additional 320 acres	• Approximately $10 million in additional costs for flood control facilities
Noise and Visual	• No sound walls would be required due to distance from residences	• Sound walls would block views of Red Rock National Conservation Area

Environmental Factors

The Preferred Alignment provides additional environmental benefits as compared to the Existing Alignment. This section reviews the air quality, flood control, noise, and visual resource advantages of the Preferred Alignment.

Air Quality

The Mountain Edge Parkway is included in the RTC's Regional Transportation Plan (RTP). The RTP conforms to the Carbon Monoxide and Pm_{10} State Implementation Plans (SIP). This means that the development of the Mountain Edge Parkway will contribute to improvements in regional air quality.

The Preferred Alignment is likely to be constructed sooner than the Existing Alignment because of its lower construction cost. Therefore, the air quality benefits that the Mountain Edge Parkway will provide at a regional level would occur sooner under the Preferred Alignment than the Existing Alignment. On the other hand, the increased cost of developing the Existing Alignment means that it is likely that the project may be delayed. The resultant delay will defer the regional air quality benefits and force the region to seek other ways to gain the air quality benefits that would be needed to maintain conformity with the CO and PM_{10} SIPs.

Flood Control

Flood control facilities would be included in the design of the Mountain Edge Parkway, with the Preferred Alignment providing flood protection for an additional 320 acres compared to the Existing Alignment. Design of the interchanges would include drainage facilities to perpetuate the stormwater runoff safely downstream. Because the Existing Alignment divides part of the KCG section into two 320 acre half sections, additional stormwater and drainage facilities would be required. City of Las Vegas estimates indicate that this would be an additional $10 million cost attributable to the Existing Alignment.

Noise and Visual Impacts

The Preferred Alignment avoids the need to construct visually obstructive sound walls that would be required along both sides of the Existing Alignment. The Preferred Alignment, which would be adjacent to the Red Rock National Conservation Area, would maximize views to the west by providing a buffer next to this sensitive resource. The buffer would eliminate the need for sound barriers along the west side of the roadway that would otherwise obstruct views.

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The City of Las Vegas

Key personnel include:

- Betsy Fretwell, Deputy City Manager
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- Jorge Cervantes, Deputy Director/City Engineer
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I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly Registered Professional Civil Engineer under the laws of the State of Nevada.

Signature: _____

Name: James Marrs, P.E.

Date: April 1, 2007 Reg. No.: 015841 Expiration Date: July 31, 2007

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